

**Universiti Teknologi MARA**

**Gamified Pregnancy Journey:  
Enhancing Fetal Development  
Education Through Interactive  
Learning**

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## ABSTRACT

The project, “Gamified Pregnancy Journey: Enhancing Fetal Development Education Through Interactive Learning”, primarily aims at bridging some of the gaps concerning maternal health education through gamification techniques in a mobile application called *FetalFrames*. It operates under three main objectives: (1) to identify the requirements that enhance information retention in expectant mothers regarding fetal development and pregnancy care; (2) to develop a mobile application incorporating gamified learning and quizzes to support expectant mothers in learning about fetal development and pregnancy care; and (3) to evaluate the effectiveness of gamified learning in improving users' understanding and reducing anxiety related to pregnancy. The mobile application was built using Android Studio (Java/XML) for frontend development and Firebase services (Authentication and Firestore Database) for backend operations. It implements a hybrid SDLC-Agile methodology which combines structured development with iterative user feedback-based enhancements. Early research and literature review provided the foundation for achieving the first objective by determining user needs such as interactive learning, personalized content, and consistent engagement. The second objective was realized through creating *FetalFrames* which is an Android mobile app that provides gamified experiences together with point-based rewards and weekly fetal development tracking features. The assessment of effectiveness for the third objective was based on System Usability Scale (SUS) results which showed that 100% of users found the navigation easy to use and 66.7% experienced lower pregnancy-related anxiety after interacting with the application. The average SUS score obtained from six users was 92.08, which falls under the “Excellent” usability category and is considered “Best Imaginable” on the SUS interpretation scale. *FetalFrames* provides special advantages to first-time mothers and patients with restricted healthcare access through its engaging and personalized educational content that is widely accessible. The application will undergo further development to support iOS platforms and multiple languages and offline functionality and AI-based personalization and healthcare professional collaboration for increased credibility and outreach. Through its combination of technology and gamification this project creates a new approach to maternal health education which delivers interactive learning experiences for healthier pregnancies.

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# **CHAPTER 1**

## **INTRODUCTION**

This chapter provides background information relating to the project. It describes the project's background, problem statement, research questions, research objectives, scope, significance, expected outcomes and project limitations which led to this research.

### **1.1 Background of Study**

Maternal health care is indeed a very important area during pregnancy at which time both the mother and the baby experience some serious changes both physically and mentally. However, many expectant mothers still lack knowledge about the stages of fetal development and the related needs for maternal health. According to Nawabi et al. (2022), most of the pregnant women remain uninformed about these critical aspects. Jackson and Silverstein (2021) further reported that 21% of Americans have never been taught about fetal development and even less than 25% can identify major pregnancy milestones. This ignorance in knowledge aggravates pregnancy-related anxiety, as many thoughts about the health of the baby, changes in physique and childbirth may be associated with distress, which may adversely affect both mother and fetus (Blackmore et al., 2016; Araj et al., 2020).

The fast technologies nowadays innovate mobile applications that can now be used conveniently in the handling of medical issues, allowing real-time access to the data available. Most of the pregnancy applications in the market today often offer articles and symptom trackers, lacking interactive features to engage users in learning. These applications usually provide weekly updates and general information on health tips but do little to increase knowledge retention or encourage behavioral change. Studies suggest that interactive learning methods such as quizzes perform better than